Bull

4.7GB SCSI–2 DVD–RAM Drive
Installation and Using Guide

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Hardware

December 2002

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Trademarks and Acknowledgements

Contents

Safety Information

Laser Safety Information

Laser Compliance

Handling the 4.7GB SCSI-2 DVD-RAM Drive

Attention: Static electricity can damage your equipment. Leave the 4.7GB SCSI-2 DVD-RAM Drive in its bag until you are ready to install it in your system unit.

Electrostatic Discharge Protection

Take the following precautions whenever you handle the 4.7GB SCSI-2 DVD-RAM Drive or other static-sensitive devices:

- Use an anti-static wrist strap if you have one.
- Limit your movement. Movement can cause static electricity to build up around you.
- Hold the drive carefully by its frame or edges. Avoid touching solder joints, pins, or other printed circuitry.
- Do not place the drive on the system unit cover or on a metal table. If you must set it aside, put it back into its bag.
- Be very careful when you handle the drive during cold weather, as low humidity and heating increase static electricity.

About This Book

This book provides information about the 4.7GB SCSI-2 DVD-RAM Drive, and how to plan your SCSI device layout, set the SCSI address (also called a SCSI ID), as well as install and use the DVD-RAM drive. Use this book along with your specific system unit and operating system documentation.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

Related Publications

Refer to your system unit and operating system documentation for information specific to your hardware and software configuration.

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Chapter 1. Overview

This chapter describes the features of the 4.7GB SCSI-2 DVD-RAM Drive. The DVD-RAM is a half-high, 5.25-inch, 8-bit, single-ended, tray-loading drive. Its distinctive features include the following:

- SCSI-2 interface supports both synchronous and asynchronous data transfer
- DVD-RAM high-speed data transfer rate of 3600KB per second (24X) max at outer diameter due to constant RPM spin rate
- DVD-RAM high-speed data transfer rate of 2705KB per second (2X DVD)
- High-speed synchronous burst rate of 10MB per second
- Average random access time of 100ms for CD-ROM and 155ms for DVD-RAM
- Can be installed in either a vertical or horizontal orientation
- Loading tray accommodates 8cm discs (in the horizontal orientation only), 12cm discs (CD-ROM), and 4.7GB DVD cartridges
- Reads multi-session discs
- Reads CD-recordable discs
- Reads CD-RW discs
- Reads/writes 2.6GB, 4.7GB, 5.2GB, and 9.4GB (double sided) DVD media
- Supports major CD-ROM formats: Mode 1, Mode 2 Form 1, XA, M2F2, and CD-DA
- Contains headphone output and line output for audio

Note: This device is available as an auto-docking feature on some systems. See your system documentation for information about the auto-docking feature.

Front View of DVD-RAM Drive
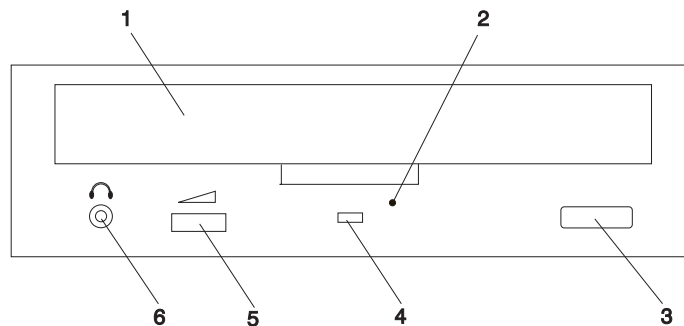
1	CD/DVD Tray
2	Emergency Eject Hole
3	Headphone Jack
4	Volume Control
5	Status Light
6	Load/Unload Button

Rear View of DVD-RAM Drive
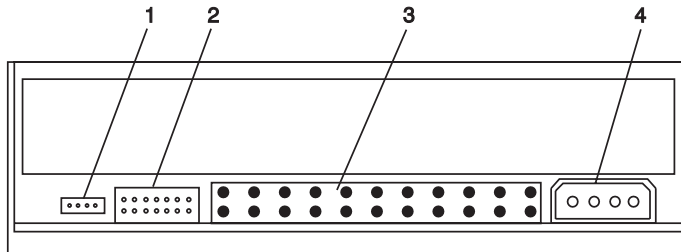
1	Audio Line Out Connector		
2	Jumper Block and Pins		
3	50-pin SCSI Interface Connector		
4	Power Connector		

Chapter 2. Preparing to Install the 4.7GB SCSI-2 DVD-RAM Drive

This chapter covers all the things you need to do before you install your 4.7GB SCSI-2 DVD-RAM Drive. Preparing to install the drive involves the following tasks:

- Verifying your hardware requirements
- Verifying your software requirements
- Making sure your package is complete
- Gathering tools and documentation
- Planning your SCSI device layout
- Determining your SCSI device address
- Setting the SCSI address

Verifying Your Hardware Requirements

The 4.7GB SCSI-2 DVD-RAM Drive requires the following hardware:

- An available bay large enough to hold a 5-1/4 inch half-high device
- A SCSI-2 adapter, which is either *built into* or *on a separate adapter card inside* your system unit
- A SCSI interface cable
- A 50- to 68-pin interposer

Verifying Your Software Requirements

The 4.7GB SCSI-2 DVD-RAM Drive is supported on AIX 4.3.3 operating system or later (with 4330-08 recommended maintenance package). Ensure that your operating system supports this DVD-RAM drive before you install it. Contact your support representative for assistance.

Checking Your Package

Check that your package contains the following items:

- The 4.7GB SCSI-2 DVD-RAM Drive
- Mounting screws
- A CD-ROM test disc
- A DVD-RAM test disc
- A 50- to 68-pin interposer
- A registration card
- 7 jumpers (included on the jumper block)
- Cleaning Kit

Contact the place of purchase if an item is missing or damaged.

Important: Be sure to retain your proof of purchase because it might be required to receive warranty service.

Gathering Tools and Documentation

To install the drive, you need the following items:

- A flat-blade screwdriver
- Your system unit documentation, including any service documentation
- Your operating system documentation

Note: If you are installing the auto-docking version of this device on your system, the remainder of this chapter does not apply to your system. See your system documentation for information about the auto-docking feature.

Planning Your SCSI Device Layout

SCSI devices include such hardware as disk drives, tape drives, CD-ROM drives, DVD-RAM drives, scanners, and printers. Some SCSI devices can be connected to or installed inside your system unit, while others can be installed externally. The devices are attached, in a daisy-chain configuration, to a SCSI adapter installed inside the system unit.

Each device in the chain has a unique SCSI address (also called a SCSI ID). When you connect more than one SCSI device, it is important that you plan the location and address of each device in the chain. You must also be sure to connect a terminator at each end of the chain. If you are using an internally connected device, the SCSI adapter provides the termination for that end. The last attached device must terminate the other end of the chain.

If your configuration includes both internal and external devices, you must connect a terminator to the last external device and terminate the internal SCSI cable. The adapter terminates one end of the chain, and the last device terminates the other end.

Determining Your SCSI Device Address

Before you install the 4.7GB SCSI-2 DVD-RAM Drive, you must set the SCSI address on the drive. First, you must determine which SCSI addresses are available to use. Then you choose an address and install jumpers on the drive to set the selected address. You can use any available SCSI address as long as no two SCSI devices on the same chain use the same address. No device can use address 7, which is reserved for the SCSI adapter.

SCSI addresses are in sequential order from highest to lowest priority. Refer to Table 1 below for the priority associated with each SCSI address. For optimum performance, choose the highest unused SCSI address between 6 and 0.

Note: Use only SCSI addresses 6 through 0 for this device.

Table 1. Data Access Priorities for SCSI Addresses

Priority	SCSI Address	SCSI Device Name
Highest Priority	7	Adapter
↓	6	
↓	5	
↓	4	
↓	3	
↓	2	
↓	1	
Lowest Priority	0	

To find an available SCSI address on an AIX system, do the following:

1. At a system prompt, type:

   ```
   lsdev -Cs scsi
   ```

   Press Enter. Information similar to the following displays:

   ```
   hdisk1 Available 00-01-00-1,0 1.0 GB SCSI Disk Drive
   ```

   This information is interpreted as follows:

   ```
   Column 1: device name (hdisk1)
   Column 2: device status (Available)
   Column 3: SCSI information (00-01-00-1,0)
   Column 4: device type (1.0 GB SCSI Disk Drive)
   ```

   In this example, the SCSI address for the device name (*hdisk1*) is 1 as shown in the 1,0 portion of the string in column 3. The 0 in the 1,0 portion of the string is the SCSI bus number for that device.

2. Find an available SCSI address for the DVD-RAM drive and choose the highest-priority unused address for yours. On Table 1, record the address you chose for your DVD-RAM drive, as well as the names and addresses of any other installed SCSI devices. Save this information for future reference.

Setting the SCSI Address

After you choose an available SCSI address for your DVD-RAM drive, you can install the jumpers on the drive to match the selected address. The SCSI address can be set from 0 to 6. Address 7 is reserved for the adapter. The 4.7GB SCSI-2 DVD-RAM Drive SCSI address is factory-set at 4. Refer to "Determining Your SCSI Device Address" on page 4 if you need instructions for selecting another SCSI address.

To set a SCSI address, you install jumpers onto pin positions 2, 3, and/or 4, located on the jumper block, to set each position to *On* or *Off*. (See Table 2 below.) To set a position to On, insert a jumper onto both the top and bottom pins. To set a position to Off, insert the jumper onto the top pin only.

Note: Jumpers are also installed in other positions on the jumper block to enable or disable other functions.

Refer to the figure on page 7 and to Table 2 below as you go through the following steps to set the SCSI address on this drive:

Attention: Be sure to read "Handling the 4.7GB SCSI-2 DVD-RAM Drive" on page vii before you begin.

1. Remove the drive from its bag.
2. Place the drive on top of the bag on a flat surface.
3. Refer to the figure on page 7. Locate pin positions **2**, **3**, and **4** on the drive. They are the first three positions on the left side of the jumper block as you view the drive from the back. The SCSI address is factory-set to 4.
4. Using Table 2 below as your guide, install jumpers in the correct positions to set the SCSI address you previously chose.

Table 2. SCSI Address Settings

SCSI Address	Position 2	Position 3	Position 4
0	Off	Off	Off
1	On	Off	Off
2	Off	On	Off
3	On	On	Off
4	Off	Off	On
5	On	Off	On
6	Off	On	On

5. Make sure the jumper on position **1** is set to Off. This position does not enable or disable any function, and can be used as a spare jumper.
6. The jumper in position **5** should be set to Off. This position does not enable or disable any function, and can be used as a spare jumper.
7. Make sure the jumper in position **6** is set to Off. This disables the drive's internal terminator power. Terminator power is provided by the system through the SCSI cable.

8. The jumper in position **7** should be set to Off. This position does not enable or disable any function, and can be used as a spare jumper.

You can remove spare jumpers and store them in a safe place or install them in the Off position on any unused pin position.

Rear View and Jumper Pin Positions on the 4.7GB SCSI-2 DVD-RAM Drive

The following figure shows the jumpers as they are set at the factory.
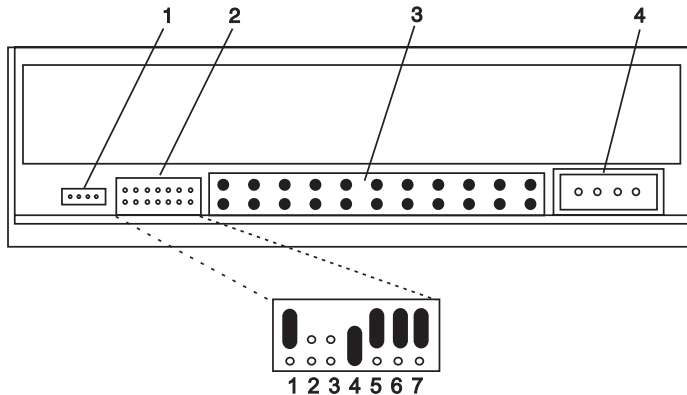
1	Audio Line Out Connector
2	Jumper Block and Jumper Pins
3	50-pin SCSI Interface Connector
4	Power Connector

Chapter 3. Installing the 4.7GB SCSI-2 DVD-RAM Drive

This chapter takes you through the steps of installing your 4.7GB SCSI-2 DVD-RAM Drive, which involves the following tasks:

Note: Make sure you have set the SCSI address. For more information, see "Setting the SCSI Address" on page 6.

- Installing the drive in your system unit
- Connecting the DVD-RAM drive
- Configuring the device driver software
- Verifying a successful installation

Note: If you are installing the auto-docking version of this device on your system, the remainder of this chapter does not apply to your system. See your system documentation for information about the auto-docking feature.

Installing and Connecting the 4.7GB SCSI-2 DVD-RAM Drive

After you set the SCSI address on your drive, you can install the drive into your system unit. The 4.7GB SCSI-2 DVD-RAM Drive must be installed into an available system unit bay and connected to a SCSI cable and power cable. Refer to "Rear View and Jumper Pin Positions on the 4.7GB SCSI-2 DVD-RAM Drive" on page 7 as you go through the following steps to install and connect the drive:

1. Follow your operating system instructions for shutting down your system, then turn off the power to your system unit. On an AIX system, type:

   ```
   shutdown -F
   ```

   at the system prompt, then press Enter. When `halt completed` displays, turn off the system unit power and unplug the power cord from the wall outlet.

2. Remove the covers of your system unit. Follow the instructions provided in your system unit documentation.

3. Install the drive in an available bay in your system unit. See the instructions in your system unit documentation for installing an internal device.

   Note: Be sure to use the screws provided with this drive. Using the wrong size screws might cause damage to the drive.

4. Plug the 50- to 68-pin interposer into the SCSI interface connector located on the back of the drive.

5. Plug the SCSI interface cable into the 50- to 68-pin interposer located on the back of the drive.

6. Plug the power cable into the power connector located on the back of the drive.

7. If an audio card is installed in your system unit, plug the audio cable into the audio connector located on the back of the drive.

8. Follow the directions provided in your system unit documentation to reinstall the covers of your system unit.

9. Plug the power cord back into the wall outlet.
10. Turn on the power to your system unit so that the operating system can update the system configuration.

Save this book and store any extra parts in a safe place in case you ever change your configuration.

Configuring the 4.7GB SCSI-2 DVD-RAM Drive

To configure the DVD-RAM drive after installation, reboot your system unit. Device drivers are provided in AIX and other operating systems that support the 4.7GB SCSI-2 DVD-RAM Drive. Your operating system should recognize the drive and should automatically update your system unit configuration.

Verifying the Installation

See the instructions provided in your system unit documentation for verifying the successful installation of the drive. To verify the installation on an AIX system, type:

```
lsdev -Cs scsi
```

at the system prompt, then press Enter. A list of SCSI devices displays. An *Available* status indicates that the drive is installed and ready to use.

Chapter 4. Installing Device Drivers

Device driver software is provided in AIX 5.1 and later, as well as other operating systems that support this DVD-RAM drive. However, if you need to install device drivers, follow the installation procedures provided in your operating system documentation. This chapter provides instructions for installing device drivers on AIX 4.3.3.0 with the 4330-08 Recommended Maintenance Package. This is the minimum AIX operating system required to support this feature.

Verifying the AIX Level

To verify your system's AIX level, do the following:

1. At the system prompt, log in as a root user.
2. Run the following command:

   `oslevel`

   - If the response is AIX 5.1.0.0 or later, no further action is required. Proceed to "Installing Files for Device Driver, Latest Diagnostics, and DVD-RAM File Backup/Restore". Otherwise, continue to the next step.

   Note: This feature is supported only on operating systems AIX 4.3.3.0 with the 4330-08 Recommended Maintenance Package, or later.

3. Run the following command:

   `oslevel -r`

   The expected response is a message similar to 4330-08 or later:

   - If the operating system is lower than AIX 4.3.3.0 with the 4330-08 Recommended Maintenance Package or if you receive a usage message, the system is not at the correct operating system level to support this feature. The system AIX level must be updated prior to installing this feature.
   - If AIX 4.3.3.0 with the 4330-08 Recommended Maintenance Package or later is installed, proceed to "Installing Files for Device Driver, Latest Diagnostics, and DVD-RAM File Backup/Restore".

Installing Files for Device Driver, Latest Diagnostics, and DVD-RAM File Backup/Restore

To install device drivers, diagnostics, and file backup/restore, do the following:

1. Insert the CD-ROM media into the appropriate media device.
2. Type `smit`, and press Enter.
3. The System Management panel is displayed. Select **Software Installation and Maintenance** and press Enter.
4. The Software Installation and Maintenance panel displays. Select **Install and Update Software** and press Enter.

5. The Install and Update Software panel displays. Select **Install and Update from Latest Software Available** and press Enter.

6. The Install and Update from Latest Software Available menu displays. Press F4 to display a list of input devices from which you can select. The cursor is already positioned on the input device entry field.

7. Either type the name of the input device in the entry field or select the appropriate device. Press Enter.

8. The panel displays the device you selected in the **Input device/directory for software** field. The **Software to update** option is highlighted.

9. Press F4 to display a list of device packages you can install.

10. To display the Find window, type:

    /

11. Type the following device package name:

    ```
    devices.scsi.disk.rte
    ```

12. Press F7 to select the device package name. Repeat steps 10-11 for the following files, as required:

    ```
    devices.scsi.disk.diag.rte
    bos.diag.com
    freeware.cdrecord.rte
    ```

13. When finished selecting, press Enter. The Install and Update from Latest Software Available panel displays the completed required fields.

14. Press Enter. The Are you sure? message displays.

15. Press Enter. The Command Status panel displays. The term Running is highlighted, indicating that the software is being installed and configured.

16. When Running changes to OK, scroll down to the bottom of the panel and locate the **Installation Summary**. If the installation was successful, Success displays at the bottom of the panel in the **Result** column of the **Installation Summary**.

17. Remove the CD-ROM media from the media device.

18. Press F10 to exit *smit*.

19. To shut down and restart your system, type:

    ```
    shutdown -Fr
    ```

    press Enter.

20. After the system has completed booting, continue to "Verifying the Installation of Device Driver, Diagnostics, and DVD-RAM File Backup/Restore (MKCD) files" on page 13 to verify the software installation.

Verifying the Installation of Device Driver, Diagnostics, and DVD-RAM File Backup/Restore (MKCD) files

To verify the file installations, do the following:

1. Use either of the following ways to verify the installation of the Device Driver Package on the AIX system:

   - Type `lslspp -l devices.scsi.disk.rte`, then press Enter.

     You should receive a message stating your AIX version has been *Committed*. Verify the version of AIX listed is correct.

   - Type `lsdev -Cs scsi` at the system prompt, then press Enter.

     A list of SCSI devices displays. An `Available` status next to the device name indicates that the drive is installed and ready to use.

2. To verify the installation of the Latest Diagnostics support on the AIX system, the following commands are required:

   - Type `lslspp -l devices.scsi.disk.diag.rte`, then press Enter.

     You should receive a message stating `devices.scsi.disk.diag.rte` and `4.3.3.51` have been `Committed`.

   - Type `lslspp -l bos.diag.com`, then press Enter.

     You should receive a message stating `bos.diag.com` and `4.3.3.50` have been `Committed`.

3. To verify the installation of the DVD-Ram Backup/Restore (MKCD) Support, type:

   ```
   lslspp -l freeware.cdrecord.rte
   ```

   press Enter.

   You should receive a message stating `freeware.cdrecord.rte` and `1.9.0.0` have been `Committed`.

4. If all of the software is available, the installation is complete and no further action is required.

5. The drive is now ready to perform backups to DVD-RAM media.

   Note: For information about creating backups to DVD, refer to the following file: **usr/lpp/bos.sysmgt/mkcd.readme.txt**

6. If any fileset is missing or not at the correct level, go to "Installing Files for Device Driver, Latest Diagnostics, and DVD-RAM File Backup/Restore" on page 11 and complete the installation.

Chapter 5. Using the 4.7GB SCSI-2 DVD-RAM Drive

This chapter provides instructions for handling the 4.7GB SCSI-2 DVD-RAM Drive, as well as CD-ROM discs and DVD-RAM cartridges. Using the 4.7GB SCSI-2 DVD-RAM Drive involves the following tasks:

- Understanding data-protection functions
- Understanding the status lights
- Maintaining the DVD-RAM Drive
- Handling DVD-RAM cartridges
- DVD media environmental limits
- Ordering DVD Media
- Handling compact discs
- Loading a compact disc horizontally
- Loading a compact disc vertically
- Loading a DVD-RAM cartridge horizontally
- Loading a DVD-RAM cartridge vertically
- Opening the tray manually
- Playing an audio CD

Understanding Data-Protection Functions

This section provides information about the various data-protection functions of the 4.7GB SCSI-2 DVD-RAM Drive.

Write Protect Function

In order to protect written data, this device enters a write-protect state (this state is independent of the write-protect tab on the cartridge) if any of the following conditions exist. In this event, the LED on the front panel flashes repeatedly as a warning (refer to "Understanding the Status Lights" on page 17).

- When a disc is loaded in which over 90% of the spare area (replacement area) has been used.
- When a disc is loaded in which three of the four defect management areas (DMAs) have been damaged.
- When a disc is loaded and dirt is detected on the drive's lens or the media.

In order to resolve the write-protect state, in the case of the first two conditions above, it is necessary to first remove the cause for the device entering the write-protect state, and then to physically format (certify) the disc.

Note: All data written on the disc will be lost, so be certain to make a backup of any important data before proceeding.

In the case of the third condition, clean the lens and the disc, and then use the disc normally.

Write Cache Disable Function

In order to prevent data from being damaged, this device disables the write cache if any of the following conditions occur while writing data:

- When over 90% of the spare writing area (replacement area) has been used on the current disc (once this media is ejected, it is in the Write-protect State).
- When two of the four defect management areas (DMAs) have been damaged on the current disc.
- When a sector has been relocated 10 or more times due to linear replacement.

Abnormal Temperature-Increase Detection Function

This device enters sleep mode and will not respond to Host commands if its internal temperature becomes abnormally high while it is in operation. In such an event, as the internal temperature nears the abnormal level, the LED on the front panel begins to flash (refer to "Understanding the Status Lights" on page 17). As the device reaches the abnormal temperature, it enters sleep mode commands. The LED continues to flash until the cause for the temperature increase has been resolved and returns to normal. When the internal temperature drops below the abnormal level, the device recovers automatically from sleep mode, and the LED stops flashing.

Note: If the drive is forced to enter sleep mode while the recording media is in use, there is a possibility (in the worst case) that data will be lost. Try to ensure this device will not be subject to abnormal temperatures even when in a system that is operating at the limit temperature and at the maximum frequency of usage.

Continuous Seek

In order to prevent any localized temperature increases within the drive, this device may lower the seek speed to a maximum of 6x or 7x if it is performing a continuous seek for an extended period of time.

Understanding the Status Lights

The status lights provide information about the operational status of the drive, as follows:

If light is:	Condition is:
Off	Drive is in standby mode with or without a disc loaded.
Blinking (Green)	Any of the following:
	• Drive tray is inserted. The light blinks while the drive completes the initialization checkout.
	• Drive is reading data. The light blinks initially while data is being read, and then turns off.
	• Drive is in Play Audio Mode. The light blinks initially while the audio is playing, and then turns off.
Blinking (Amber)	Hardware error condition found during initialization or operation.
	• Three consecutive blinks per second indicates Defect Management Area problem, or more than 90% of the spare has been used (device automatically enters the write-protect state).
	• Two consecutive blinks per second indicates dirty lens or media (the device automatically enters the write-protect state).
	• One blink per second indicates internal device temperature is abnormally high (when the device reaches the abnormal temperature level, it will enter Sleep Mode and not respond to Host commands).
	Note: If any of these warning conditions occur, refer to "Understanding Data-Protection Functions" on page 15.

Maintaining the DVD-RAM Drive

When this device is used for an extended period of time, it is possible that dust, can accumulate on the lens portion of the optic head and on the surface of the media, making normal operation impossible. Although the proper frequency for cleanings depends on the environment and the conditions under which the device is used, the device should be cleaned once every one to four months, using a cleaning kit (sold separately as IBM PN 19P0489, CD/DVD Disc and Lens Cleaner).

Other Handling Considerations

Be sure to take the following additional precautions when you use the DVD-RAM drive:

- Remove compact discs and DVD-RAM cartridges from the tray before you move the drive.
- Do not place the drive where any of the following conditions exist:
  - High temperature
  - High humidity
  - Excessive dust
  - Excessive vibration or sudden shock
  - Inclined surface
  - Direct sunlight
- Do not insert foreign objects into the drive.
- Do not stack objects on the drive.
- Do not remove the drive covers or attempt to service the drive yourself.

Handling Compact Discs

Compact discs are high-density media that must be handled with care and kept clean to ensure that they remain readable. Use the following precautions to ensure reliability:

- Hold the compact disc by the edges. Do not touch the surface of the compact disc.
- To remove dust or fingerprints, wipe the compact disc from the center to the outside of the compact disc, as shown.

Attention: Wiping the compact disc in a circular direction can cause loss of data.
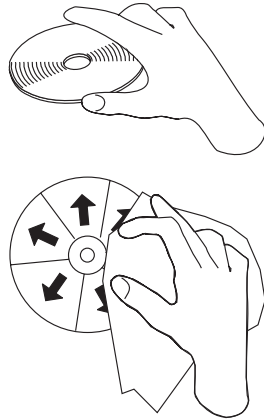
- Do not write on the surface.
- Do not store or place the compact disc in direct sunlight.
- Do not use benzene, thinners, or other cleaners to clean the compact disc.
- Do not drop or bend the compact disc.
- Do not store or place the compact disc in a dirty or dusty environment, or in a humid or hot location.
- Do not attempt to re-use labels.
- Store discs in their case when they are not in use.

Handling DVD-RAM Cartridges

There are two types of DVD-RAM disc cartridges: Type I and Type II. The disc of a Type II cartridge can be removed, while a Type I disc cannot. While a Type II disc is removed, it can only be read, not written. Furthermore, when a Type II disc is reinstalled in the cartridge, the device always writes on that disc in verify mode, regardless of the actual settings.

Note: If a Type II DVD-RAM disc becomes dirty or scratched and is then returned to its cartridge, the writing performance when using that disc may deteriorate, become unwritable, or even become unreadable in some cases.

DVD-RAM Media Environmental Limits

The following table lists environmental requirements for the 4.7GB SCSI-2 DVD-RAM Drive.

Table 3. Environmental Limits

Operating Conditions (see note 1)	
Temperature	+5 ~ to 60 degrees C [critical point + 60 degrees C; 25% RH
Relative Humidity	3 ~ 85%
Absolute Humidity	1 ~ 30g/M3
Temperature/Relative Humidity Gradient	<10 degrees C/H, < 10% H
Shipping Conditions	
Temperature	-40 to 60 degrees C
Relative Humidity Disk packaged for shipping	3 ~ 85% RH (including condensation but excluding rain)
Wet Bulb Temperature	29 degrees C maximum
Altitude	0 to 39,400 feet
Storage Conditions	
Temperature	- 10 ~ 50 degrees C
Relative Humidity Disk packaged for shipping	3 ~ 85 % RH
Wet Bulb Temperature	29 degrees C maximum
Altitude	0 to 39,400 feet

Notes:

1. No condensation on or in the disk is required for operation. If disks are exposed to conditions outside those specified, it shall be acclimatized in an allowed operating environment for at least two hours before use.
2. Parameters apply at the disk surface unless otherwise noted.
3. Under shipping conditions, the packaging must ensure that the disk surface is not exposed to over 95% humidity, and condensation must be prevented.

Ordering DVD-RAM Media

All DVD cartridges are not alike. The media composition and length, and the construction of the cartridge itself, can all affect the quality and capacity of the recording and the performance of your DVD drive. A poor-quality DVD cartridge might appear to work adequately in your system, yet it can leave contamination in the media path or impede the speed of the recording.

The following list identifies DVD media cartridges that you can order for the 4.7GB SCSI-2 DVD-RAM Drive. To order cartridges, contact your local provider of storage products. The following table provides you with the part numbers of quality DVD media cartridges that can be purchased from your local provider.

Table 4. DVD-RAM Media

2.6 GB Single Sided, Type II	DVD Media Cartridge
5.2 GB Double Sided, Type I 5.2 GB in a 5-pack	DVD Media Cartridge
4.7 GB Single Sided, Type II 4.7 GB in a 5-pack	DVD Media Cartridge
9.4 GB Double Sided - Type I 9 .4 GB in a 5-pack	DVD Media Cartridge
4.7 GB Single Sided - Type II	DVD Test Disk
650MB CD-ROM Disc	CD-ROM Test Disc
CD/DVD Lens and Disc	Cleaning Kit

Note: Type II DVD-RAM cartridges contain a removable disc, while Type I cartridges do not.

Loading a Compact Disc Horizontally
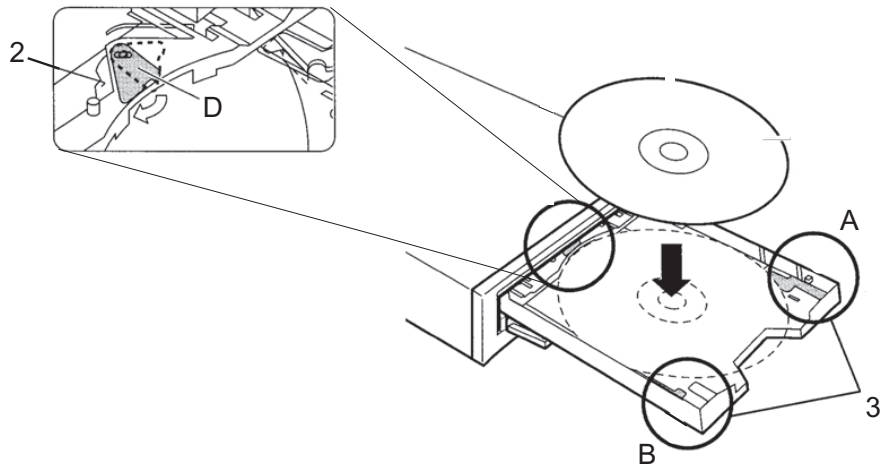
To load a compact disc into a horizontally mounted drive, do the following:

1. Press the Load/Unload button to open the tray. The tray slides out of the drive.
2. Fold out the stopper (D) at the back of the tray.
3. Lower disc holder A and B so that they are the same height as the tray.
4. Place the compact disc in the tray with the label facing up. The disc must fit inside the tray's disc guides (12cm and 8cm) for the DVD-RAM drive to be able to read the disc.
5. To close the tray, press the Load/Unload button, or gently push the tray in.

Loading a Compact Disc Vertically

Note: if you are using an 8cm disc, the DVD-RAM drive must be in the horizontal position.

To load a compact disc into a vertically mounted drive, do the following:

1. Press the Load/Unload Button to open the tray.
2. Fold out the stopper (D).
3. Raise disc holders A and B so that they are higher than the tray.
4. Insert the disc diagonally between the stopper and the tray, and push the disc about 1cm towards the stopper.
5. Pull the disc back so it fits between the tray and disc holders A and B.
6. To close the tray, press the Load/Unload button, or gently push the tray in.

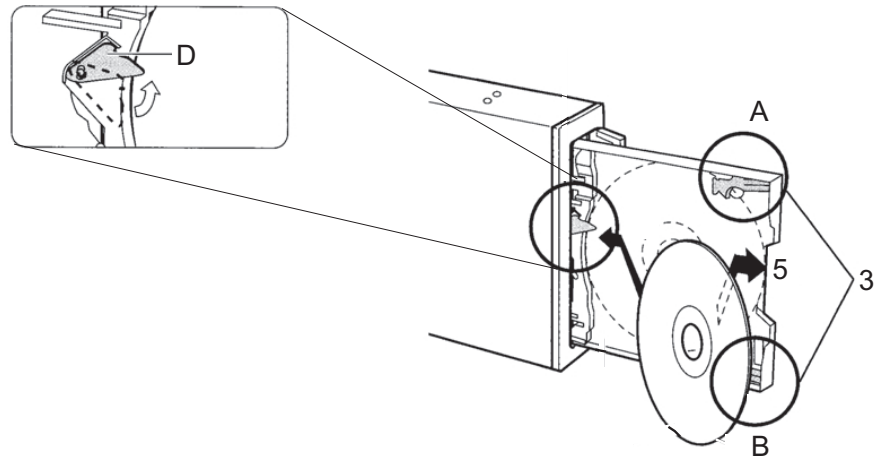## Loading a DVD-RAM Cartridge Horizontally

To load a DVD-RAM cartridge into a horizontally mounted drive, do the following:

1. Press the Load/Unload button to open the tray. The tray slides out of the drive.
2. Insert the DVD-RAM cartridge so that the label side of the shutter is facing up.
3. Push the DVD-RAM cartridge about 2cm toward the DVD-RAM drive.
4. Press gently on the shutter label so the DVD-RAM cartridge sits securely in the tray.
5. To close the tray, press the Load/Unload button, or gently push the tray in.

Loading a DVD-RAM Cartridge Vertically
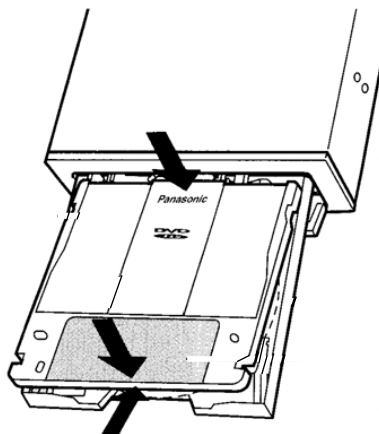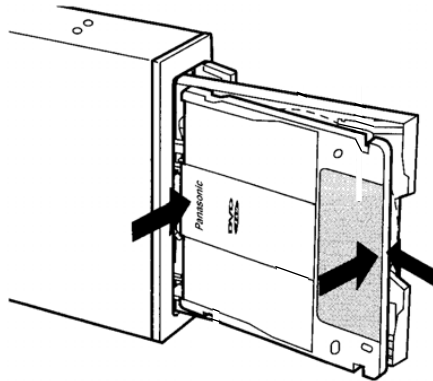

Note: If you are using an 8cm disc, the DVD-RAM drive must be in the horizontal position.

To load a DVD-RAM cartridge into a vertically mounted drive, do the following:

1. Press the Load/Unload button to open the tray. The tray slides out of the drive.
2. If necessary, lower disc holders A and B so that they are the same height as the tray.
3. Insert the DVD-RAM cartridge so that the label side of the shutter is facing up.
4. Push the DVD-RAM cartridge about 2cm toward the DVD-RAM drive.
5. Press gently on the shutter label so that the DVD-RAM cartridge sits firmly on the tray.
6. To close the tray, press the Load/Unload button, or gently push the tray in.

Note: Do not extend the two upper retaining tabs when you operate the drive in the vertical position.

Opening the Tray Manually

The tray should automatically open when you press the Load/Unload button. If it does not automatically open, follow these steps to manually force it open:

1. Shut down and turn off the power to your system unit.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance. If you are not sure where the emergency eject hole is located, see "Front View of DVD-RAM Drive" on page 1.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.
4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

Playing an Audio CD

To play an audio CD, you must either have headphones connected to the headphone jack located on the front of the drive or an audio card connected to the line out connector located on the back of the drive. You must also have an audio software application installed.

The headphone jack provides the connection for headphones using a 3.5mm (1/8-inch) stereo mini-plug. The volume control adjusts the audio output level for the headphones.

Appendix A. Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

Federal Communications Commission (FCC) Statement

Note: The 4.7GB SCSI-2 DVD-RAM Drive has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from authorized dealers. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:
- International Business Machines Corporation
- New Orchard Road
- Armonk, New York 10504
- Telephone: (919) 543-2193

FC Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
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と、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

The following is a summary of the VCCI Japanese statement in the box above.

This product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG–Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

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The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

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Nº Reférence / Reference Nº :   86 A1 12EG 00

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